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Does institutionalization influence perceived metamemory, psychological well-being, and working-memory efficiency in Italian elders? A preliminary study



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ABSTRACT

Background/Purpose: This study was mainly aimed at investigating the impact of institutionalization on working-memory and self-referent metamemory abilities in a sample of cognitively healthy Italian elders.

Methods: Fifteen participants (70–91 years old) were recruited from several nursing homes located in Ogliastra, the central eastern area of Sardinia, which is characterized by a higher longevity of its inhabitants. A further sample of 15 community-dwelling elders was recruited in the same areas. The participants were asked to complete several visuospatial and verbal working-memory tasks, and a battery of questionnaires assessing their psychological well-being, general beliefs about global and prospective-memory efficiency, and personal metamnemonic abilities.

Results: The results showed that, compared with the community-dwelling participants, the institutionalized elders self-rated lower metamemory efficiency, but they trust more general metamemory functions of a stereotypical adult. Furthermore, no differences were found on the well-being measures between the two groups. These outcomes are not biased by social desirability.

Conclusion: These findings suggest that institutionalization selectively impacts self-assessed metamemory functions, but not psychological well-being.

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1. Introduction

Contemporary research indicates that superior mental health in late adulthood is associated with increased longevity. For example, Wang et al.¹ carried out a longitudinal study for 15 years with over 3000 urban and rural community-dwelling Chinese adults aged ≥ 55 years at baseline. The authors found that longevity and mental health are strictly related. Moreover, the former is mainly associated with better physical and social conditions, and protective factors, such as exercise and education. Similarly, Yates et al.² conducted a 25-year prospective cohort study of almost 1000 healthy American oldest-old (i.e., aged ≥ 90 years) elders, showing that

modifiable biological and behavioral factors (e.g., smoking, hypertension, diabetes, regular physical exercise) can predict longevity and psychological well-being. Moreover, a longitudinal study conducted with over 1100 Israeli elderly people (i.e., aged ≥ 70 years) for more than 7 years documented that longevity was strictly related to a specific indicator of mental health influencing the psychological well-being, the so-called will to live, that is, the expression of the striving for life.³ Specifically, it was found that elders reporting a lower will-to-live index were usually more depressed, less physically healthy (e.g., presence of chronic illnesses), less life satisfied, and survived less.

However, during the past 2 decades, studies of exceptional longevity have been concentrated in Sardinia, an Italian island located in the Mediterranean Sea. Thus, recent evidence has shown that elderly people living in the rural areas of Sardinia live for a long time,⁴ and possess both superior subjective well-being and fewer depressive signs compared with people residing in the agropastoral

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areas of Northern Italy.^{5–7} In this regard, Fastame et al.⁸ found greater levels of personal satisfaction and coping strategies among cognitively healthy Sardinian elders that were recruited from the agropastoral area of Ogliastra than among peer residents from the rural areas of Lombardy, a region located in Northern Italy. These outcomes were replicated even among the oldest-old (i.e., aged > 75 years) participants,⁹ that is, those living a developmental phase frequently stated to be characterized mainly by cognitive losses than with age-related assets, such as wisdom or life experience.¹⁰ At present, the literature concerning the possible causes of positive aging is somewhat disparate. This suggests the involvement of a wide range of factors, the impact of which varies according to geographical location. Within the Sardinian population, evidence for the involvement of both genetic mechanisms⁴ and sociocultural factors^{7,11} has been obtained. In this regard, Carpinello et al.¹¹ suggested that preservation of mental health was accounted for in part by stronger relationships in the community. Thus, Sardinian elders have been found to be better supported by, and more actively involved in, local social networks.^{6,8} This is consistent with their valued role in the community both as a resource for younger generations and as a repository of tradition and local culture.

There is also evidence that psychological well-being is associated with metacognitive characteristics in late adulthood.^{5,12} According to Flavell,¹³ *metacognition* refers to one's knowledge about the efficiency of his/her cognitive processes that serves to achieve specific learning goals by controlling the cognitive actions that are coordinated, and then carried out to increase learning. The selection of cognitive actions can be driven by the knowledge about the characteristics of the task that has to be carried out, the knowledge about the abilities of the learner that are requested by the task, and the knowledge about the appropriate strategies to achieve the learning outcomes. One specific construct related to metacognition is called *metamemory*, which includes: (1) one's knowledge about memory tasks and mnemonic processes; (2) one's awareness about memory monitoring; (3) beliefs about the efficiency of one's memory functions; and (4) emotional aspects (i.e., fatigue, anxiety, depression) related to the execution of memory processes.¹⁴ It is of interest that, among older people, high trust in the efficiency of their control cognitive processes is associated with a range of positive psychological outcomes. These include greater optimism about the efficiency of their mind in later adulthood, lower levels of depressive symptoms, higher levels of personal satisfaction, and the increased use of memory strategies to limit their mnemonic losses.^{15,16} Metacognitive factors appear to play a role in healthy aging among elders. First, reports indicate that Sardinian elderly people are more confident about the efficiency of their metacognitive and metamemory skills than older participants recruited in Northern Italy.^{7,8} Second, greater trust in the efficiency of memory processes is associated with superior life satisfaction, reduced depressive symptomatology, and increased optimism about their future.^{8,9,17}

Overall, the foregoing evidence suggests at least two considerations. First, a series of psychological and sociocultural factors seem to contribute—perhaps with a specific genetic pattern—in impacting positive aging among elders. Second, one potentially serious limitation of previous studies is that only community-dwelling elderly participants were involved. In particular, the benefits associated with greater community involvement and esteem may be absent or diminished among institutionalized elders. Limited evidence is available to resolve this issue. Indeed, we are aware of only one recent study conducted by Fastame and Cavallini,¹⁸ which showed that the working-memory efficiency of cognitively healthy elders residing in nursing homes was comparable with that of community-dwelling old participants. However, to our knowledge, no studies have been carried out to deeply

explore self-referent metacognition and well-being in Western institutionalized elderly people.

More widely, two studies have been conducted to investigate metamemory efficiency and mental health in geriatric-care-facility residents. First, Ide et al.¹⁹ reported that beliefs about the memory capacity of Japanese nursing-facility elders were influenced by the presence of depressive signs both in cognitively intact participants as well as in those with mild cognitive decline. That is, more depressed individuals tended to underestimate their memory efficiency. Second, McDougall²⁰ reported a positive effect of 8-week metamemory training on beliefs about the efficiency of prospective memory and memory change in a group of 16 cognitively healthy American older adults living in a nursing home. Specifically, after the metamemory training, the participants showed an increased trust in their memory efficiency, and reported that their memories were more stable and less subjected to decline than prior to training. Scores on a memory self-efficacy questionnaire also improved. Overall, the intervention was effective in changing the negative, stereotypical beliefs about declining memory in late adulthood.²⁰

Given this limited evidence base, there is a need to explore whether significant differences in psychological well-being and metamemory measures can be found between community-dwelling older adults and assisted-living elders without any signs of cognitive decline. In addition, from a clinical perspective, in order to promote mental health in late adulthood, such data are important for confirming the role of sociocultural factors in positive aging among long-lived elders, such as the Sardinian elders. It can be speculated that the benefits of social context will be diminished among institutionalized elders being expressed as lower subjective wellness and lower trust in metacognitive and metamnemonic efficiency.

Consequently, the current study was mainly aimed at exploring whether geriatric-health-facility populations present lower self-rated psychological well-being and metamemory efficiency scores than community-dwelling older adults residing in the rural areas of Sardinia. Furthermore, it was also explored whether metamemory correlated with working-memory span. Finally, it was also investigated whether working-memory efficiency was impacted by institutionalization.

As suggested by Fastame and Cavallini,¹⁸ no differences were expected in mnemonic performances of assisted-living elders with no signs of cognitive decline and community-dwelling older adults. Furthermore, it was hypothesized that a positive relationship between personal metamemory scores and working-memory efficiency exists.⁵ Finally, no hypotheses were made concerning the level of subjective psychological health, metacognition, and metamemory of older adults living in their own homes or in geriatric-health facilities, because there is no empirical evidence about the potential role of institutionalization in late adulthood and specifically in the Italian context.

2. Methods

2.1. Participants

Thirty-five cognitively healthy community-dwelling and assisted-living elders were recruited from the rural area of Ogliastra, a small region in Sardinia where a very simple lifestyle prevails. The participants were recruited from that particular Sardinian area because a trend of research^{8,17,21} reports high levels of mental health among the elderly people residing there.

The eligibility criteria to take part in the investigation included: (1) being born and residing in Ogliastra; (2) being independently living elders or residing in a geriatric health facility; and (3) showing

no signs of cognitive impairment. In order to satisfy these criteria, the potential participants were screened for cognitive deterioration using the Mini Mental State Examination (MMSE).²² It follows that participants having a score below 24/30 on the MMSE were excluded for suspected signs of mild cognitive decline. Five participants recruited from the aged-care services were excluded because their MMSE was < 24. Overall, the final sample was composed of 30 elderly residents in Ogliastro that were recruited through personal contacts and via direct appeals to the local social services.

Table 1 outlines the sociodemographic characteristics of the sample.

Gender ($\chi^2 = 0$, degree of freedom (df) = 1, $p > 0.99$, $\phi = 0.07$) was equally distributed across the two groups (i.e., community-dwelling elders vs. nursing-home residents), as well as the assumption of medicines ($\chi^2 = 0.53$, df = 1, $p = 0.46$, $\phi = 0.20$) to cure the most common pathologies associated with aging (e.g., hypertension, insomnia). By contrast, the education level that was dichotomized according to low (i.e., 1–8 years) and high (> 8 years) levels, as suggested by De Beni et al.,²³ was not counterbalanced across the participants ($\chi^2 = 13.3$, df = 1, $p < 0.0001$). Specifically, 86.7% of the independently living older people and 80% of the geriatric-nursing-home residents presented lower education. This was expected because the participants were recruited from the rural areas of Sardinia where an agropastoral lifestyle prevails.

2.2. Materials

After having completed the written informed consent process, each participant was presented the following tests/questionnaires:

- (1) The MMSE is composed of 30 items assessing the spatial–temporal orientation, attention, short- and long-term memory, visual-motor integration, and mental-calculation functions.²² This pencil-and-paper tool is used to screen the general cognitive efficiency. A score ≤ 23 was used to exclude volunteers with suspected cognitive impairment. The score was corrected for years of education and age of the participants.
- (2) A preliminary interview, developed by Fastame and Penna,²¹ was conducted in order to collect information on the socio-demographic characteristics and lifestyle (e.g., time spent reading and watching television, years of education) of the respondents.
- (3) The Psychological Well-Being and Aging Questionnaire (PWAQ)²³ assesses subjective wellness in sexagenarians and over. This tool is composed of 37 items providing four measures: a general psychological well-being (i.e., PWAQ-tot); coping strategies (i.e., SC-PWAQ, which has been

operationalized as the capacity to tackle and solve daily life problems); personal satisfaction (i.e., PS-PWAQ, which indicates the level of satisfaction for one's past life and life success); and emotional competencies (i.e., EM-PWAQ, which represents the capacity to interact with others, and understand and share their emotional status) indices. For each item, the participants had to self-rate their status along a 4-point Likert scale ranging from 1 (never) to 4 (often). The maximum total well-being index is 148. According to De Beni et al.,²³ a score ≥ 115 indicates a very high self-perceived subjective well-being; by contrast, a score ≤ 103 denotes a critical and very low level of psychological wellness.

- (4) The Sensitivity to Memory Questionnaire²⁴ is composed of 34 items, providing a self-rated measure of mnemonic efficiency and attitude to recall autobiographical events. Moreover, this tool offers an index of the metacognitive sensitivity to autobiographical recall that has been defined as the tendency to store memories about personal events using external supports (e.g., diary) or metamnemonic procedures to favor retrieval. The participants were invited to self-rate on a 4-point Likert scale, ranging from 0 (never/no) to 3 (often/yes), the frequency of occurrence of specific behaviors/attitudes related to memory functioning. The maximum total score is 102. As suggested by De Beni et al.,²³ a score ≤ 52.55 was used as the cutoff to denote a low sensitivity to memory.
- (5) The Global Memory Efficacy and the Efficiency Memory for Future Events subsets of the General Beliefs Memory Inventory were developed by Lineweaver and Hertzog²⁵ to self-assess personal belief about the efficiency of memory functions in the adulthood lifespan. According to the original procedure, the participants have to track a line along a series of single vertical graduated scales indicating the level of memory efficiency of a hypothetical adult being 20 years, 30 years, 40 years, 50 years, 60 years, 70 years, 80 years, or 90 years old. Thus, it provides a developmental trend where the higher the track for each target age, the greater is the estimation of mnemonic efficiency at a given age. For each decade, the maximum score is 100, because the scale is 100 mm long and the score represents the distance from the lower extreme to the track. Therefore, for the aims of the current study, the data had to be collected in an area where there is a high prevalence of centenarians, and the adult span was extended, that is, the participants were invited to rate the general memory efficiency and prospective memory of prototypical 20-year-old to 100-year-old adults. Furthermore, for each target age, each respondent had to assess the mnemonic efficiency in adulthood using an 11-point Likert scale, ranging from 0 (lack of efficiency) to 10 (maximum efficiency).
- (6) The Marlowe and Crown Social Desirability Scale by Crowne and Marlowe²⁶ was adapted in Italian for elderly people by Fastame and Penna.²¹ This tool is composed of 33 statements assessing the socially rejected but probable behaviors, and socially acceptable but less likely situations relative to the daily life. One score is attributed to each socially desirable answer. The maximum score is 33. As suggested by Fastame and Penna,²¹ a score > 27.14 was used as the socially desirable attitude index in participants aged ≥ 75 years.
- (7) The Forward Digit Span Test by Wechsler²⁷ is a verbal working-memory task assessing passive sequential processes, which was validated in Italian by Orsini and Pezzuti.²⁸ The participants were asked to retrieve in the same order an increasing sequence of digit numbers immediately after its presentation.

Table 1
Sociodemographic characteristics of the sample.

	Community-dwelling elders		Institutionalized elders	
<i>n</i>	15		15	
Gender				
Males	8		7	
Females	7		8	
Age range (y)	67–91		70–91	
Age (y)	<i>M</i> = 79.9 (6.4)		<i>M</i> = 77.5 (7)	
Education				
	Males	Females	Males	Females
1–8 y	7	6	5	7
> 8 y	1	1	2	1

Note. *M* indicates mean score, whereas standard-deviation scores are illustrated in brackets. Data are distinguished by community-dwelling and institutionalized groups.

- (8) The Backward Digit Span Test²⁷ (Italian validation by Orsini and Pezzuti²⁸) is a verbal working-memory task assessing active sequential processes. The procedure is similar to that of the Forward Digit Span Test, but in this case, the participants had to immediately recall an increasing sequence of digits in backward order, that is, starting from the last stimulus presented, then the penultimate one, and so on.
- (9) The Visual Pattern Test (VPT) by Della Sala et al.²⁹ (Italian adaptation by De Beni et al.²³) is a passive visuospatial working-memory test. It consists of the immediate recall of an increasing pattern of spatial positions placed on a grid varying in size and shape. Stimuli were presented for 3 seconds, and after that, the participants were invited to locate a series of pieces on a neutral grid where the target stimuli were previously located.
- (10) The Jigsaw Puzzle Test by Vecchi and Richardson³⁰ was adapted in Italian by De Beni et al.²³ It is an imagery test providing an active visuospatial working-memory efficiency measure. Firstly, each participant was presented a black-and-white image of a common object (e.g., suitcase, bicycle) for 2 seconds, and after that, he/she was asked to solve a puzzle composed of 2–10 pieces representing that item. Fragments could not be moved or touched, but they were numbered. Therefore, in order to reassemble each object, the participants were asked to point out the numbered pieces of the stimulus on a neutral grid—composed of the same number of elements as the puzzle—in the positions in which he/she would locate each fragment. Each puzzle had to be solved within 90 seconds.
- (11) The Wechsler Adult Intelligence Scale (WAIS) Vocabulary Test provides a measure of crystallized-intelligence efficiency, because it requires the definition of 40 words.^{31,32} The examiner read aloud each target stimulus, and then the participant had to explain its meaning. Depending on the completeness and accuracy of the definition, the examiner could give each answer a 0, 1, or 2 score. The words were presented in order of difficulty. The test continued until the participant failed to define five consecutive items, or when he/she remembered the meaning of the last word.

2.3. Procedure

Each participant was tested individually in a quiet room of his/her own home or nursing home in two separate sessions that were carried out on 2 consecutive days. In order to avoid the fatigue effect, the participants were asked to express their preferred answer after the experimenter had read aloud each statement of the questionnaires or trial of the working-memory tasks. In case the participant did not understand some statements contained in the questionnaires, the experimenter could provide further explanations.

In the first session, first the MMSE, and then the sociodemographic interview were presented. Therefore, the order of presentation of the further questionnaires was counterbalanced across the participants. Similarly, the order of administration of all working-memory tests was randomized. The working-memory efficiency (i.e., span) was assessed by computing for each task administered the average of the three longest sequences of stimuli correctly recovered. Finally, in order to have a further measure of cognitive efficiency, the vocabulary test was presented.

The participants did not receive any incentives (e.g., economic reward) to take part in the study.

Overall, the experimental sessions lasted approximately 60 minutes.

3. Results

Table 2 summarizes the mean scores and the relative standard deviation in psychological well-being, metamemory, and social-desirability measures across the community-dwelling older participants and assisted-living elders.

Two independent-sample *t* test comparisons were conducted to explore the main effect of institutionalization (i.e., independently living elders vs. geriatric-nursing-home residents) on the MMSE and WAIS vocabulary scores. As expected, there was no significant difference in the mean general cognitive efficiency [$t(28) = -0.46$, $p = 0.65$] and crystallized-intelligence index [$t(28) = 0.48$, $p = 0.64$] of the community-dwelling elders and the geriatric-nursing-home residents.

Next, a one-way multivariate analysis of covariance was conducted in order to examine the impact of institutionalization on the subjective well-being measures of Sardinian elders, while controlling the effect of social desirability as covariate. The multivariate tests did not highlight the negative impact of residing in aged-care institutions (Wilks's lambda = 0.003; $df = 4, 24$; $p = 0.48$) or of socially responding style (Wilks's lambda = 0.003; $df = 4, 24$; $p = 0.86$). Indeed, the main effect of institutionalization was not significant on the total subjective well-being index [$F(1, 28) = 1.27$, $p = 0.27$] or on coping strategies [$F(1, 28) = 1.07$, $p = 0.31$], personal satisfaction [$F(1, 28) = 1.31$, $p = 0.26$], and emotional competence [$F(1, 28) = 0.24$, $p = 0.63$] measures.

A one-way analysis of covariance was carried out to investigate the effect of group (i.e., community-dwelling elders vs. geriatric-health-facility residents) on self-rated Sensitivity to Memory scores, while controlling for the social desirability. The analysis revealed a significant effect of group [$F(1, 27) = 5$, $p = 0.03$, $\eta^2_p = 0.15$], whereas the effect of the covariate was not statistically significant [$F(1, 27) = 0.15$, $p = 0.70$]. It was found that elderly people living in their own home trusted more the efficiency of their memory [$M = 69.7$, standard deviation (SD) = 3.09] than aged-care residents ($M = 62.1$, SD = 12.5).

Two further separate analyses of covariance were conducted to investigate the impact of group (i.e., community-dwelling elders vs. geriatric-health-facility residents) on the Global Memory Efficacy and Efficiency Memory for Future Events indexes of the General Beliefs Memory Inventory, and the social-desirability score was used as covariate. These analyses revealed the main effect of group

Table 2

Mean (*M*) scores relative to the general cognitive efficiency (i.e., mini-mental state examination), vocabulary, general subjective psychological well-being (i.e., PWAQ-tot), life satisfaction (i.e., PS-PWAQ), coping strategies (i.e., SC-PWAQ), emotional competence (i.e., EM-PWAQ), sensitivity to memory, general memory efficiency, prospective-memory-efficiency indexes, and social-desirability (i.e., Marlowe and Crown social-desirability scale) measures distinguished by community-dwelling residents and institutionalized elders.

	Community-dwelling elders	Institutionalized elders
MMSE	$M = 26.72$ (1.14)	$M = 26.49$ (1.6)
Vocabulary	$M = 39.13$ (14.1)	$M = 41.8$ (16.5)
PWAQ-tot	$M = 110.07$ (2.6)	$M = 107.53$ (8.1)
PS-PWAQ	$M = 33.13$ (2.06)	$M = 31.53$ (5.2)
SC-PWAQ	$M = 25.9$ (2.1)	$M = 24.87$ (3.1)
EM-PWAQ	$M = 29.9$ (3.9)	$M = 30.5$ (3.5)
Sen-Memo	$M = 69.67$ (3.09)	$M = 62.07$ (12.5)
GME	$M = 6.4$ (0.18)	$M = 6.8$ (0.31)
PME	$M = 6.8$ (0.38)	$M = 7.16$ (0.42)
MCSDS	$M = 13$ (1.56)	$M = 12.8$ (2.4)

Note. Standard deviations are illustrated in brackets.

GME = general memory efficiency; MCSDS = Marlowe and Crown social-desirability scale; MMSE = mini-mental state examination; PME = prospective-memory efficiency; Sen-Memo = sensitivity to memory.

both for global mnemonic efficiency [$F(1, 27) = 19.6, p < 0.0001, \eta^2_p = 0.42$] and prospective memory [$F(1, 27) = 6.56, p = 0.02, \eta^2_p = 0.2$]. Specifically, nursing-home elders trusted more the global memory efficiency of a prototypical adult ($M = 6.8, SD = 0.31$) than the community-dwelling residents ($M = 6.4, SD = 0.18$). Similarly, people living in geriatric health facilities showed more optimistic beliefs about the memory efficiency for future events of a hypothetical adult ($M = 7.2, SD = 0.42$) than independent-living older participants ($M = 6.8, SD = 0.38$). By contrast, the effect of social desirability as covariate was not significant on both the Global Memory Efficacy [$F(1, 27) = 1.645, p = 0.24$] and Efficiency Memory for Future Events [$F(1, 27) = 2.5, p = 0.13$] measures.

Furthermore, Pearson product-moment indexes were calculated to explore the relationship between self-rated metamemory score and several measures of working-memory efficiency. There were significant relationships between the Sensitivity to Memory scores and the Backward Digit span ($r = 0.47, p = 0.009$, with a 95% confidence interval ranging from 0.13 to 0.71, estimated *post hoc* power of study = 0.85, estimated sample size = 30), the Visual Pattern span ($r = 0.43, p = 0.018$, with a 95% confidence interval ranging from 0.08 to 0.68, estimated *post hoc* power of study = 0.78, estimated sample size = 30), and the Jigsaw Puzzle span ($r = 0.53, p = 0.003$, with a 95% confidence interval ranging from 0.21 to 0.74, estimated *post hoc* power of study = 0.93, estimated sample size = 23). By contrast, the relationship between the Sensitivity to Memory measure and the Forward Digit span was not significant ($r = 0.31, p = 0.10$).

Finally, a one-way multivariate analysis of variance was conducted to investigate the impact of institutionalization on working-memory measures. The multivariate tests did not highlight the significant main effects of group (Wilks's $\lambda = 0.89$; $df = 4, 25$; $p = 0.58$). There were no significant differences between community-dwelling and assisted-living elders on Forward [$F(1, 28) = 0.22, p = 0.64$] and Backward Digit Span [$F(1, 28) = 1.16, p = 0.30$] Tests, as well as on the VPT [$F(1, 28) = 1.72, p = 0.20$] and Jigsaw Puzzle Test [$F(1, 28) = 1.73, p = 0.19$].

4. Discussion

The current study was mainly aimed at exploring the impact of institutionalization on self-referent measures of psychological well-being and metamemory assessed in cognitively healthy elderly people.

An interesting outcome is that no differences were found in terms of psychological well-being between the community-dwelling elders and the geriatric-health-facility residents living in Ogliastro. Both the institutionalized elders and community-dwelling participants showed similar levels of personal satisfaction, emotional competency, and coping strategies. These results support and extend previous research by Fastame et al.⁷ and Carpinello et al.¹¹ These reports suggested that a supportive context for elders is sufficient to impact positively the mental health of older people. Indeed, it can be speculated that the adequate level of personal satisfaction and general psychological well-being of the institutionalized group can be explained by the fact that assisted-living elders participated in different gratifying recreational, social, and cultural daily life activities promoting mental health in aging. Similarly, as suggested by Fastame et al.⁶ and Carpinello et al.,¹¹ community-dwelling elders residing in Ogliastro are physically and socially active. That is, usually, they spend their time gardening or supporting charity associations; otherwise, they often attend senior centers where different recreational activities are proposed (e.g., painting). Moreover, traditionally, men can attend

sport associations (e.g., for hunters), whereas old women can share their interest for needlework with neighbors.

This seems to be crucial, because as suggested by Duncan-Myers and Huebner,³³ occupational therapy and more general leisure activities are essential to enhance the quality of life of residents in long-term-care facilities. Moreover, involvement in leisure and general occupational activities seems to be crucial for the maintenance of cognitive efficiency and working memory. Thus, in agreement with Fastame and Cavallini,¹⁸ in the current study no differences were found between the institutionalized and community-dwelling groups in visual and verbal working-memory tasks.

Overall, the current study documented at least two important differences between community-dwelling and institutionalized elders. First, the institutionalized participants reported greater trust in the global mnemonic and prospective-memory efficiency of a hypothetical adult man as assessed by the General Beliefs Memory Inventory.²⁵ However, the assisted-living participants were less confident about the efficiency of their metamemory than the community-dwelling elderly people (i.e., reported lower scores in the Sensitivity to Memory Questionnaire).²⁴ Therefore, while institutionalization does not impact self-perception of psychological wellness, it does influence the self-assessment of metamnemonic functions.

In line with previous research,^{8,34} significant relationships were also found between self-referent metamemory measures and specific working-memory functions. That is, the participants showing greater passive spatial working memory (i.e., performance in the VPT), active verbal working memory (i.e., performance in the Backward Digit Span Test), and active visuospatial working-memory spans (i.e., performance in the Backward Corsi Block Task) reported greater trust in their metamemory efficiency. These findings support the idea that the efficiency of working memory is strictly related to the self-perception of one's own memory efficiency and vice versa.⁸

Finally, it is necessary to point out that, unlike previous findings reported by Fastame and Penna,²¹ Dijkstra et al.,³⁵ and Soubelet and Salthouse,³⁶ in the current study self-reported measures of psychological well-being and metamemory were not contaminated by social desirability. Indeed, in the series of multivariate analyses of covariance conducted on the data, the effect of social-desirability scores as a covariate was not significant. The participants did not try to impress the examiner by offering an exaggerated, positive self-image. Overall, it seems that the quality of life of elderly people is not undermined by their self-perception of metamemory processes or working-memory efficiency.

Overall, although the current findings confirm and extend the understanding about factors associated with positive aging, and then quality of life in late adulthood, the study presents some limits, and therefore, a cautious interpretation of the findings is necessary. Indeed, the results of the current investigation have to be considered preliminary because the size of our sample is limited. Relatively low numbers of institutionalized elders were available because, within this region of Sardinia, the elderly people usually live in their own home or are generally assisted by their relatives until death. Usually, only elders without a family network reside in long-term geriatric-health facilities; assisting older people at home is a value deeply rooted in the culture of the people from Ogliastro.

A further limitation is that the education level of our participants was not counterbalanced. Previous reports indicate that the self-assessment of psychological well-being can be influenced by education,³⁷ and future research has to clarify the impact of education on self-assessment of psychological well-being and meta-cognition of institutionalized elderly people.

Moreover, it has to be acknowledged that, if Sardinian elderly people represent an atypical population characterized by active aging, the current outcomes cannot be generalized to older people residing in other Italian areas. Therefore, future research has to explore whether the current findings can be replicated in further samples of institutionalized elderly people living both in urban and rural areas. Second, it has to be pointed out that Ogliastra represents a blue zone, that is, it is a specific geographic area characterized by the higher longevity of its inhabitants.⁴ Therefore, if specific genetic and environmental factors contribute significantly to the maintenance of efficient working-memory and metamemory processes in late adulthood, it can be hypothesized that the current pattern of outcomes would be replicated also in further blue zones, such as Okinawa (i.e., Japan), Icaria (i.e., Greece), and Nicoya (Costa Rica), that is, where there is evidence of a very high proportion of centenarians.³⁸ To date, to our knowledge, no studies have been conducted in those areas to investigate the aims of the current study. Therefore, future research has to clarify whether the specific pattern of working-memory and metamemory resources that we found in institutionalized and community-dwelling Sardinian elders can be generalized to the elderly people living in the other blue zones.

Finally, a further limit of this study is that metamemory beliefs and working-memory efficiency were self-assessed only in community-dwelling and institutionalized older people residing in assisted-living facilities. Therefore, at present, we cannot exclude that the current findings can be also applied to elders supported by other types of long-term-care facilities, such as the senior centers. These are useful community services providing different types of social and cognitive activities, which are aimed at actively promoting the mental health of elderly people (i.e., with or without cognitive impairment) who are still cared for at home, but that attend the services in a protective setting during the day. Future research has to clarify whether the current findings can be generalized to the older people using the aforementioned community services, especially in the Italian context, where a national long-term assisted-care program for elderly people lacks, and the promotion of interventions supporting mental health in late adulthood is strictly related to the local initiatives of the social-health services and the availability of financial resources.³⁹

Conflicts of interest

The authors declare no conflict of interest.

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